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ICTs and effective communication strategies *: specific needs of information before, during and after disasters*

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Abstract*—There is a widespread agreement that the mass media are a powerful and important source of people's perception of the world, the world of foreseen or unforeseen disasters and risk being no exception. Within disaster management the national media system is an especially important means of disseminating warnings and information. However, media organisations have their own logic and goals that are not necessarily compatible with the logics and goals of disaster planning and assistance agencies. Thus, how the media interpret their responsibility to warn and inform presents particular problems. Recent developments in the media sector have altered the production, content and reception of disaster and risk messages in numerous ways. Additionally, increasing numbers of natural and man-made disasters, with effects that can be minimized, requires adaptations in disaster management strategies. Here, the focus is on improving current practices in communicating disasters and risk. On the face of it, the use of advanced information and communications technologies (ICTs), such as the internet for emergency websites or cell phones appear to be good solutions, bridging a gap between the public and disaster management. However, if authorities take a technologically determinist approach, they fail to account for the ways in which audiences actually use information sources. People are not passive absorbers of media information; rather they are active seekers and users that 'make up their own minds'. When these factors are overlooked plans to communicate with citizens can be undermined. The research findings presented here, based upon investigations of basic problems faced by the media in reporting risk, public information needs and behaviour in the face of risk perceptions leads to conclusions that are the basis for recommendations to improve communication strategies in disaster situations. This contribution will identify some of the common challenges that emergency management professional face in planning to meet the needs of the population during and after disasters. The use of ICTs and other strategies employed to minimize the impact of a disaster are also discussed.

Keywords: media change, new media, risk perception; risk management; media user

I. INTRODUCTION

The overall growing importance of mass media in the so-called 'information society' combined with society's increased dependence on media information is important to the perception, regulation and management of risk issues at a local, national and international level. During larger events the media are often the first source of information for many people, including responders as well as victims.

When people are under threat, perceived or actual, they intensify their information seeking. In such circumstances the national media system has big responsibility in disseminating news as well as how the public perceives disasters. Emergency officials must be skilled in crafting concise, accurate, and timely public messages. Successfully communicating information will often be hindered by news production conditions over which disaster management agents have no control. For example, the selection of personal interest stories and the deployment of tabloid style journalism can be a hindrance rather than a help in the dissemination of disaster management plans. Furthermore, digital communication technologies provide increasing numbers of communication channels, making everyday media usage increasingly fragmented. Thus in a crisis situation the public has many choices for their information needs. From the citizens' perspective, searching for useful information among media sources, they are often confronted with an opaque mixture of disaster news. Moreover, people respond to such information according to their own perceptions of the characteristics of the event and their own circumstances. We know that risk and threats are inherently difficult to communicate effectively.

ICT applications appear to be good solutions for bridging gaps between the public and disaster management. It may seem an unproblematic system for disaster communication and effective for informing the right people with the right information at the right time. However, from the perspective of involved authorities, a technologically determinist approach does not sufficiently recognize that societies are made up of individuals. Not understanding media channels or adjusting to the public's actual and changing use of these channels can worsen crisis and disaster situations and

the effectiveness of mitigation and response efforts (Zemp, 2010).

The first step in addressing this deficiency is to recognize it is an important problem. Here we will argue that communication strategies that are not aligned with the changing media environment and how potential victims actually use information is a vital oversight by those involved with risk awareness or response efforts. By mapping the structures of disaster coverage deployed by traditional mass media we can identify which areas of the disaster process are covered and which topics are relatively neglected or ignored. The consequences of the media outputs in reporting disasters, as well as the public's information seeking behaviours and perceptions of risk, enable us to identify lessons for the use of new media for risk communication. This includes recognising both the capacities and limits of ICT.

II. DISASTER MANAGEMENT: NEWS MEDIA ROLES AND OPERATIONS AND PUBLIC INFORMATION ABOUT RISK

The non-routine nature of disasters or crisis increases the importance of accurate information. Collaborative efforts are required by disaster and risk management agencies with a wide range of media, because communication is a core function during a crisis and the management of disasters. In addition, the greater access to wider range of media by people assists the local and timely dissemination of warnings and information. New communication channels, such as SMS services along with internet and World Wide Web (WWW) sites, offer great potential in supporting future hazards facing any nation. It is crucial that the public has realistic perception of the risks they face and that communication motivates preparation for disaster as well as appropriate actions during an event and in the process of recovery afterwards. Disaster communication can be vital to survival in the face of uncertainties that require interpretation, explanation and consolation. An understanding of risk is central to decisions that must be made. Problems in the communication process between disaster agencies and the public can spread dysfunctional dynamics with destructive consequences (Comfort, et al., 2004).

Communication that is effectively disseminated into the public sphere can stimulate public debate useful in both informing and creating policy agendas for future planning (Seeger, 2008; Auf der Heide, 2009). Policy-makers and disaster agencies acknowledge the increasingly powerful role of the mass communicaton system in the process of disaster communication.

For the overall goal of risk reduction, it is useful to divide the communication strategies into three phases:

1. Public awareness (pre-event)
2. Public warning (during the event)
3. Informing and advising the public (immediately following and long-term post-event)

In all three phases the media is vital to the communication strategies of disaster agencies and media channels (newspapers, television, radio and – increasingly internet or cell phones), providing easy access to a large public. Through all phases the level of coverage, exposure, placement, headlines and photographs, contribute to the way in which events and risks are construed by the public in the immediate and the long term (Ashlin & Ladle, 2007). However, liaison with journalists is not a straightforward exercise and institutions often face difficulties in working with media organisations and personnel. Disaster agencies and media organisations have different and sometimes conflicting, goals. While agencies must assure public safety, media organisations want to attract readers, viewers or listeners. Real world events interact with journalistic norms and business practices.

The core function of the media is not simply to transfer information or to report what has happened and what is being done. Rather, the media is a dynamic interpreter that analyses events and even prescribes what should be done (Peters, 2009). The mass media operates as a critic in democracies, where scrutinizing public officials' performances is a well-accepted practices, along with institutions to judge, punish, compensate and protect the general public. In other words, the publication of information and criticism perceived to be of public interest is understood as one of the primary roles of mass media in democratic societies (McQuail, 2005).

It is also a fact that mass media does not mirror or simply reflect the world. The manner in which the media's versions of everyday events are communicated and what is important enough to be regarded as news is very selective in what it depicts. Thus, the original messages that agencies wish to convey may differ considerably from media output. The way of this selective depiction in which 'the media facilitates our contact with social reality' apparentliy provides the most salient information for people about disasters and risks (McQuail, 2005:83).

From the disaster management point of view, what they expect from the media – especially under extreme urgency – and what they get, may support but can also obstruct the goals of disaster authorities and relief organisations (Peters, 2009).

A better understanding between these two disparate requirements and the organisations involved is of critical importance for effective disaster communication. From an agency perspective, these include thinking strategically about communication and

planned interactions with traditional as well as new media channels.

A. Media change and new media

Until the 1980s mediated disaster communication was based primarily up on print and broadcast sources, such as television and radio. With emerging new technologies, the landscape of communication has changed in recent years. Not only were government monopolies in broadcasting and telecommunications broken up in the 1980s and 1990s, digital communication technologies enabled an increasing number of communication channels. New media, particularly the Internet, facilitates interactive communication and is used as an alternative tool for communicating disaster by agents. In addition, these media structure changes have led to more individualised and commercialised communication and the weakening of public service oriented goals of media reporting (Picard, 2005).

New communication technologies at the end of the 20th century, resulted in the trend of news globalisation. Now media organisations must compete for attention in the public sphere, packaging their stories for a globalised audience in an increasingly competitive and unprecedented 24/7 real time context (Cottle, 2009). Most importantly, media and journalistic activities, that decide what is and what is not newsworthy is increasingly dependent on audience ratings and sales figures. News values for instance, unexpectedness, negativity, dread, personalisation or good visuals, are often regarded as factors that contribute in practice to the newsworthiness of a potential story (Ruhrmann & Göbbel, 2007).

The internet has become increasingly important in the media market and to business strategies affecting journalistic research practices and growing online activities of traditional media organisations. Media are catering to a growing mobile consumer audience and new competitors have arisen. Given the actual and perceived influence of the mass media, biases that exist in the mass media have been subjected to intense scrutiny and harsh criticism. In summary, there have been two different developments that have jointly changed the media ecology during the last decades: (1) a long-term trend towards commercialisation, and (2) the emergence of new media based on digital technology.

B. Reaching the public

Events such as Hurricane Katrina, the Asian Tsunami or the growing list of pandemics showed that there exists significant technical potential to reach the general public. However, lack of planning and (with) multiple audiences at the receiving end, this has led to, and the potential remains for fiasco after fiasco. In short, warnings go unheeded, with even fewer taking swift action, including responsible authorities, resulting in failure all round.

The addressee is a critical part in every disaster communicating process via mass media. Therefore, audience and usage of the media have to be considered. Research shows that the audience is not a passive and homogeneous receiver of information. Individual characteristics, varying information needs and different information seeking behaviour all must be accounted for. These parameters are important meditating factors of media effects (Seeger, 2008). The uses-and-gratifications perspective suggests that the audiences media choices and usage – whether for instrumental or ritualised reasons – are characterised by the following features: (1) Socio-psychological needs, which generate (2) expectations of (3) the mass media and other sources, therefore leading to (4) differentiated patterns of media exposure, resulting in other consequences, perhaps mostly unintended. This approach shifts the emphasis in communication science to the question, "What do people do with media?", and away from the former paradigm of assumed effects, "What does media do to people?" (Blumer & Katz, 1974). The audience is weaving together mediated knowledge, institutionally acquired knowledge, along with the information and evaluation resources grounded in personal experiences and local knowledge, in order to make sense of a situation. Acknowledging this active process means there are substantial variations in both the interpretation of and reaction to specific media content (Bonfadelli, 2001). This shifting interplay between information sources constrains and limits understanding.

III. CASE STUDY: INFORMATION ACQUISITION, PERCEPTION OF RISK & PRESS COVERAGE OF FLOODS

Several conclusions from my research findings are the basis for recommendations for improved communication strategies in disaster situations. In assessing the theoretical assumptions, we will use two different data sets as the basis for the recommendations that follow.

A. Data base

The first data set consists of a large telephone survey conducted in 2007. It focuses on a major flood in 2005 and covers issues concerning information sources, perception of the risk and preventative actions taken by the public. The representative sample consisted of 2063 participants, ranked with respect to age (15-95) and gender for each of the 26 Swiss cantons. The second data set is a content analysis of the media coverage of floods in Switzerland from 1910 until 2005. Four major Swiss daily newspapers have been selected for the sample – Neue Zürcher Zeitung, Tages-Anzeiger, Luzerner Zeitung, and the tabloid Blick. This longitudinal study provides an opportunity to trace and analyse changes in the media system, the

conditions under which disaster management works, and the resulting press coverage (Zemp, 2010).

B. Public information seeking behaviour and media use in disaster situations

In the case of calamities, the public becomes dependent on the media for important information from public authorities and news. Also, active information seeking by the audience is increasing. This is supported by our study: Nearly a third of the respondents (30%) reported an increase in media consumption during disaster periods. The respondents demonstrate pervasive access to different news media during the crisis (see Fig.1).

Although the percentages rise slightly as the second or third most important sources of information, its general influence as an information source during a crisis is marginal. This is coherent with the findings of other analyses (Noll, 2003).

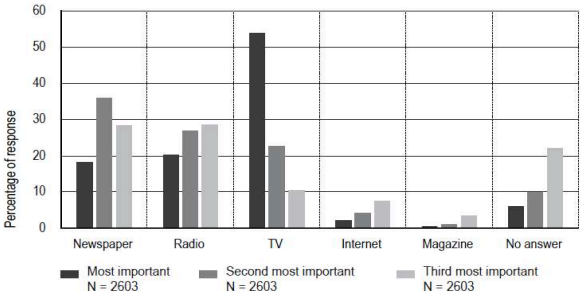

Figure 1. Use of news media in the August flood 2005: A comparison of importance

C. The gap in information interests and media content

People have specific information needs during a crisis. At the top of the list is the desire for expert knowledge and opinion regarding causes and consequences of a flood (48.7 %). This is followed by information on how the community is coping with the crisis and political crisis intervention (28.7 %). Next comes information about rescue operations and official help (26.9 %), followed by advice on what to do (24.3 %) and interest in individual stories of victims (24 %). The least important information is on donations and other assistance (17.3 %).

Despite this stated public interest, looking at the press coverage of the floods from 2000 to 2005 only one in twenty articles included particularised expert knowledge and information on causes.

Interestingly, the respondents express relatively little interest for information about life support and advice on actions to be taken by potential victims. More importantly, over time the focus of coverage shifts towards human interest stories. Such stories are marginal in the earlier coverage produced during the period public service oriented journalism. Damage and consequences as well as future expectations also increasingly shape the mediated representation of disaster reporting at present day. The number of pictures and the space occupied by visualisations has increased from event to event and reached a peak in 2005. And not to ignore is the alarming tones, compared to the more neutral language in the first half of the 20th century. All these underline the interpretation that there is a trend toward the tabloidization of disaster coverage. The end effect of such coverage may have implications how society responds to disaster and risk that is yet to come.

D. Risk perception and protective behaviour - Responses to risk by lay people

Most people know that floods can generally result in serious damage to environment, property and people. However, the perceived personal possibility of being affected by a flood the findings from the survey are sobering (see Fig.2). Only a small number of respondents envisaged a high personal risk (5%). Most people (81%) classified their personal situation as low risk concerning flood damage. As expected, the less the perceived risk is the less preventative or protective action gets taken. Safety beliefs did have a cross-linked influence on safety behaviour. Nevertheless, most people perceiving a high level of personal risk stated that they had not implemented any kind of precautionary measure (57%).

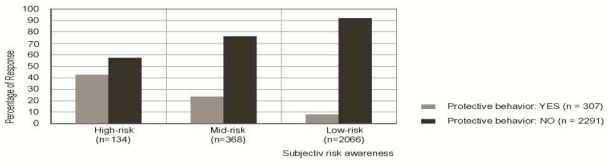

Figure 2. Use of news media in the August flood 2005: A comparison of importance

Numerous studies point out that people without flood experience can not envisage the negative effects of severe damage due to floods (Siegrist & Gutscher, 2006; Miceli, Sotgiu & Settanni, 2008). Not surprisingly, in this group most people did not take preventive actions in case of a flood situation (93 %). People who had previous flood experience did take such measures more often; still the small percentage in this group (22 %) is surprising. Siegrist & Gutscher (2006) assume that reasons for not taking preventive action in

spite of personal affectedness are the high costs of measures or knowledge gaps about possible measures.

IV. IMPLICATIONS OF THE CASE STUDY FOR DISASTER COMMUNICATION & THE USE OF ICT

To achieve the goal of effective disaster management, agencies need to take into account the divergence between media coverage, audience interests, and information necessary for public safety. The mass media have their own logic; they primarily address the whole general public, not only people directly affected by the disaster, and want to attract audiences for advertisers. Furthermore, prior coverage of disasters creates preconditions affecting the ways in which disasters get perceived and covered. These factors are compounded by market pressures faced by journalists in the context of competition. Despite the general increase in media coverage on floods in Switzerland media seem to trivialise the actual risk. Perhaps the use of ICT technologies, and especially the internet, as critical assess points to government disaster services can compensate for the mass media's shortcomings. Car must be taken in the evidence for the increase in demand for Internet news in demand.

First, information provided by the disaster agency directly and via ICT is independent of the gatekeeping process by classical media outlets. ICTs offer disaster agencies the opportunity to create their own web pages, to constantly update information beyond space and time limitations, and address audiences directly. Second, the traditional one-to-many communication without feedback provisions and the hierarchical relationship between media communicators and audiences are replaced by bi-directional or multi-directional communication (Geser, 2002). New media enable users to set up personal preferences for the kind of information they want to receive. For disaster management, personalised forms of information before, during or after an event offer useful applications. Additionally, as web-based software supports interactive tools, people are able to report incidents, post messages and start discussions (Morris & Ogan, 1996; Geser, 2002). Third, the electronic mode of communication results in abundant information in all domains of disaster and risk knowledge.

However, if we only focus on technological solutions within the field of computer-mediated communication and neglect audience information needs and media usage habits, we ignore limitations in disaster communication. First, it is important to note that new media are only one element alongside many in peoples' daily lives and media choices. For the effective use of ICT communication the question 'How to lead people to specific web portals?' is of primary importance. Second, ICT and related information sources often lack credibility. Third, there may be sources that spread inaccurate or even false information, prior to official assessments. For example the increasing use of social network sites for information seeking may bypass official information can be problematic. Fourth, ICT raises questions concerning issues of access, exclusion and participation. These differences need to be accounted for and dealt with by disaster management agencies (Zemp, 2010).

V. CONCLUSION

The study highlights the necessity of developing user-centered communication strategies when delivering warnings and risk communication to the public. This is crucial for the overall goal of risk reduction and effective disaster management. Good communication in a disaster is much more than posting information on the Internet and working with news organisations.

Today, disaster management agencies are required to understand complex media systems as well as the mechanisms and usage made by the public as plural media users. Understanding the gaps between market-oriented coverage by the press, radio or TV and the reality of actual risks and disasters for the public is vital. Authorities must deal with bridging these gaps and developing strategies to communicate useful information that motivates potential and actual victims to take appropriate preparations and actions at all stages. Knowing what the public believes as well as what they understand and how they interpret specific issues is essential. As we have illustrated, the underestimation of flood risk in Switzerland, despite repeated occurrences, is a common phenomenon. Boosting risk perception can help individuals to envisage negative consequences and motivate mitigating behaviour although they have no previous experience of such events. Dealing with misperceptions is a requirement for risk management agencies that needs to be addressed so that the public are enabled to respond effectively.

Developing capabilities to reach the majority of the population in a timely way and with the right information before, during, and in the aftermath of disaster, is a particular challenge. ICT may give disaster management many opportunities and enormous resources for communicating disaster information, which cannot be filled by traditional media. With this in mind much more research is needed. Because disasters are not only dynamic events but also events that intersect with the public's information habits and a rapidly changing media environment (with all its technological possibilities), these factors need to be fully understood and continuously monitored in order to strategically plan and effectively adapt disaster management and communication.

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